

CLAIMS

What is claimed is:

1. An isolated polynucleotide comprising a first nucleotide sequence encoding a polypeptide of at least 494 amino acids that has at least 80 % identity based on the Clustal method of alignment when compared to a polypeptide selected from the group consisting of SEQ ID NOs:2 and 4 or a second nucleotide sequence comprising the complement of the first nucleotide sequence.

2. The isolated polynucleotide of Claim 1, wherein the first nucleotide sequence consists of a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1 and 3 that codes for the polypeptide selected from the group consisting of SEQ ID NOs:2 and 4.

3. The isolated polynucleotide of Claim 1 wherein the nucleotide sequences are DNA.

4. The isolated polynucleotide of Claim 1 wherein the nucleotide sequences are RNA.

5. A chimeric gene comprising the isolated polynucleotide of Claim 1 operably linked to suitable regulatory sequences.

6. A host cell comprising the chimeric gene of Claim 5.

7. A host cell comprising an isolated polynucleotide of Claim 1.

8. The host cell of Claim 7 wherein the host cell is selected from the group consisting of yeast, bacteria, plant, and virus.

9. A virus comprising the isolated polynucleotide of Claim 1.

10. A polypeptide of at least 494 amino acids that has at least 80% identity based on the Clustal method of alignment when compared to a polypeptide selected from the group consisting of SEQ ID NOs:2 and 4.

11. A method of selecting an isolated polynucleotide that affects the level of expression of a flavonoid biosynthetic enzyme polypeptide in a plant cell, the method comprising the steps of:

(a) constructing an isolated polynucleotide comprising a nucleotide sequence of at least one of 30 contiguous nucleotides derived from an isolated polynucleotide of Claim 1;

(b) introducing the isolated polynucleotide into a plant cell;

(c) measuring the level of a polypeptide in the plant cell containing the polynucleotide; and

(d) comparing the level of polypeptide in the plant cell containing the isolated polynucleotide with the level of polypeptide in a plant cell that does not contain the isolated polynucleotide.

12. The method of Claim 11 wherein the isolated polynucleotide consists of a nucleotide sequence selected from the group consisting of SEQ ID NOs:1 and 3 that codes for the polypeptide selected from the group consisting of SEQ ID NOs:2 and 4.

13. A method of selecting an isolated polynucleotide that affects the level of expression of a flavonoid biosynthetic enzyme polypeptide in a plant cell, the method comprising the steps of:

- (a) constructing an isolated polynucleotide of Claim 1;
- (b) introducing the isolated polynucleotide into a plant cell; and
- (c) measuring the level of polypeptide in the plant cell containing the polynucleotide to provide a positive selection means.

14. A method of obtaining a nucleic acid fragment encoding a flavonoid biosynthetic enzyme polypeptide comprising the steps of:

- (a) synthesizing an oligonucleotide primer comprising a nucleotide sequence of at least one of 30 contiguous nucleotides derived from a nucleotide sequence selected from the group consisting of SEQ ID NOs:1 and 3 and the complement of such nucleotide sequences; and
- (b) amplifying a nucleic acid sequence using the oligonucleotide primer.

15. A method of obtaining a nucleic acid fragment encoding a flavonoid biosynthetic enzyme polypeptide comprising the steps of:

- (a) probing a cDNA or genomic library with an isolated polynucleotide comprising at least one of 30 contiguous nucleotides derived from a nucleotide sequence selected from the group consisting of SEQ ID NOs:1, 3 and the complement of such nucleotide sequences;
- (b) identifying a DNA clone that hybridizes with the isolated polynucleotide;
- (c) isolating the identified DNA clone; and
- (d) sequencing the cDNA or genomic fragment that comprises the isolated DNA clone.

16. A composition comprising the isolated polynucleotide of Claim 1.

17. A composition comprising the isolated polypeptide of Claim 10.

18. An isolated polynucleotide comprising the nucleotide sequence having at least one of 30 contiguous nucleotides derived from a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1, 3 and the complement of such sequences.

19. An expression cassette comprising an isolated polynucleotide of Claim 1 operably linked to a promoter.

20. A method for positive selection of a transformed cell comprising:

- (a) transforming a host cell with the chimeric gene of Claim 5 or an expression cassette of Claim 19; and

(b) growing the transformed host cell under conditions which allow expression of the polynucleotide in an amount sufficient to complement a mutant cell with altered isoflavone 2-hydroxylase activity to provide a positive selection means.

21. The method of any one of Claims 11 or 13 wherein the plant cell is a monocot.
22. The method of any one of Claims 11 or 13 wherein the plant cell is a dicot.
23. An isolated polynucleotide comprising a first nucleotide sequence encoding a polypeptide of at least 141 amino acids that has at least 80 % identity based on the Clustal method of alignment when compared to a polypeptide of SEQ ID NO:6 or a second nucleotide sequence comprising the complement of the first nucleotide sequence.
24. A polypeptide comprising at least 141 amino acids that has at least 80% identity based on the Clustal method of alignment when compared to a polypeptide of SEQ ID NO:6.

TABLE 1		TABLE 2		TABLE 3		TABLE 4		TABLE 5		TABLE 6		TABLE 7		TABLE 8		TABLE 9		TABLE 10		TABLE 11		TABLE 12		TABLE 13		TABLE 14		TABLE 15		TABLE 16		TABLE 17		TABLE 18		TABLE 19		TABLE 20		TABLE 21		TABLE 22		TABLE 23		TABLE 24		TABLE 25		TABLE 26		TABLE 27		TABLE 28		TABLE 29		TABLE 30		TABLE 31		TABLE 32		TABLE 33		TABLE 34		TABLE 35		TABLE 36		TABLE 37		TABLE 38		TABLE 39		TABLE 40		TABLE 41		TABLE 42		TABLE 43		TABLE 44		TABLE 45		TABLE 46		TABLE 47		TABLE 48		TABLE 49		TABLE 50		TABLE 51		TABLE 52		TABLE 53		TABLE 54		TABLE 55		TABLE 56		TABLE 57		TABLE 58		TABLE 59		TABLE 60		TABLE 61		TABLE 62		TABLE 63		TABLE 64		TABLE 65		TABLE 66		TABLE 67		TABLE 68		TABLE 69		TABLE 70		TABLE 71		TABLE 72		TABLE 73		TABLE 74		TABLE 75		TABLE 76		TABLE 77		TABLE 78		TABLE 79		TABLE 80		TABLE 81		TABLE 82		TABLE 83		TABLE 84		TABLE 85		TABLE 86		TABLE 87		TABLE 88		TABLE 89		TABLE 90		TABLE 91		TABLE 92		TABLE 93		TABLE 94		TABLE 95		TABLE 96		TABLE 97		TABLE 98		TABLE 99		TABLE 100		TABLE 101		TABLE 102		TABLE 103		TABLE 104		TABLE 105		TABLE 106		TABLE 107		TABLE 108		TABLE 109		TABLE 110		TABLE 111		TABLE 112		TABLE 113		TABLE 114		TABLE 115		TABLE 116		TABLE 117		TABLE 118		TABLE 119		TABLE 120		TABLE 121		TABLE 122		TABLE 123		TABLE 124		TABLE 125		TABLE 126		TABLE 127		TABLE 128		TABLE 129		TABLE 130		TABLE 131		TABLE 132		TABLE 133		TABLE 134		TABLE 135		TABLE 136		TABLE 137		TABLE 138		TABLE 139		TABLE 140		TABLE 141		TABLE 142		TABLE 143		TABLE 144		TABLE 145		TABLE 146		TABLE 147		TABLE 148		TABLE 149		TABLE 150		TABLE 151		TABLE 152		TABLE 153		TABLE 154		TABLE 155		TABLE 156		TABLE 157		TABLE 158		TABLE 159		TABLE 160		TABLE 161		TABLE 162		TABLE 163		TABLE 164		TABLE 165		TABLE 166		TABLE 167		TABLE 168		TABLE 169		TABLE 170		TABLE 171		TABLE 172		TABLE 173		TABLE 174		TABLE 175		TABLE 176		TABLE 177		TABLE 178		TABLE 179		TABLE 180		TABLE 181		TABLE 182		TABLE 183		TABLE 184		TABLE 185		TABLE 186		TABLE 187		TABLE 188		TABLE 189		TABLE 190		TABLE 191		TABLE 192		TABLE 193		TABLE 194		TABLE 195		TABLE 196		TABLE 197		TABLE 198		TABLE 199		TABLE 200		TABLE 201		TABLE 202		TABLE 203		TABLE 204		TABLE 205		TABLE 206		TABLE 207		TABLE 208		TABLE 209		TABLE 210		TABLE 211		TABLE 212		TABLE 213		TABLE 214		TABLE 215		TABLE 216		TABLE 217		TABLE 218		TABLE 219		TABLE 220		TABLE 221		TABLE 222		TABLE 223		TABLE 224		TABLE 225		TABLE 226		TABLE 227		TABLE 228		TABLE 229		TABLE 230		TABLE 231		TABLE 232		TABLE 233		TABLE 234		TABLE 235		TABLE 236		TABLE 237		TABLE 238		TABLE 239		TABLE 240		TABLE 241		TABLE 242		TABLE 243		TABLE 244		TABLE 245		TABLE 246		TABLE 247		TABLE 248		TABLE 249		TABLE 250		TABLE 251		TABLE 252		TABLE 253		TABLE 254		TABLE 255		TABLE 256		TABLE 257		TABLE 258		TABLE 259		TABLE 260		TABLE 261		TABLE 262		TABLE 263		TABLE 264		TABLE 265		TABLE 266		TABLE 267		TABLE 268		TABLE 269		TABLE 270		TABLE 271		TABLE 272		TABLE 273		TABLE 274		TABLE 275		TABLE 276		TABLE 277		TABLE 278		TABLE 279		TABLE 280		TABLE 281		TABLE 282		TABLE 283		TABLE 284		TABLE 285		TABLE 286		TABLE 287		TABLE 288		TABLE 289		TABLE 290		TABLE 291		TABLE 292		TABLE 293		TABLE 294		TABLE 295		TABLE 296		TABLE 297		TABLE 298		TABLE 299		TABLE	
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